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## EUROPEAN PATENT SPECIFICATION

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④ A snap locking device for a container with a cover.

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## Description

The invention concerns a snap locking device for a container with a cover, said cover being lockable to the container, said device comprising a ring which is formed on the cover, said ring being bistable and movable between a loosened and a locked position and is adapted to cooperate with a locking flange on the container.

A snap locking device of the above mentioned type is known from LU-A-83 681. This device has the disadvantage of not being pilferproof. It is impossible to see from the outside whether the container has been opened after it has left the factory or filling station.

In CA-A-897 635 a container lid securing device is shown which contains a plurality of clamping devices which are holding the lid. These clamping devices are biased in a direction to the center line of the container and are not bistable. This renders it difficult to open the container because the clamping devices always have the tendency to hold the container edge. One cannot, either, detect easily whether the container has been opened previously.

Containers with a bistable ring are known e.g. from the French Patent Application 2 377 333 which concerns the principle of locking devices comprising bistable components. However, such a simple closing arrangement for packages above a certain size is not sufficient when a package is to be used for storing both high-viscous and low-viscous substances. These may be e.g. food products, such as butter, margarine, jam, and paint, or they may be substances for use in the medical and pharmaceutical industries.

The Danish Published Application 145 194 describes a container/cover structure which operates with a bistable locking ring. However, this is a structure which has been found not to be stable in transport, storage and stacking. Further, the package is not provided with a seal device, which is increasingly demanded by many buyers.

The Danish Patent Application 3870/83 concerns a package which is formed with seal, but constructed in such a manner as to operate upon rupture of vertical wall constrictions; however, it has been found that this form of seal has a poor control function because the wall constrictions are very little informative. The information value of the seal state is particularly essential in the pharmaceutical industries, and in the other fields of use there is a tendency for more stringent demands on the opening and closing mechanism of packages.

The object of the invention is to provide a snap locking device which provides a hermetically tight package and is pilferproof in that it allows easy detection that it has been opened previously.

This object is achieved in that said ring is formed with substantially vertical weakened lines, wherein ring portions disposed between at least two weakened lines are exteriorly provided with wall reinforcements, said wall reinforcements extending axially over the ring portions and over a stationary cover flange disposed in extension of said ring.

In addition to providing a hermetically tight package, this, container structure also has the advantage that the at least two weakened lines, serving as a seal device, is provided so that the ring portion disposed between them is integral with the stationary ring portion, so that the resulting, relatively rigid edge face serves as snap locking means. When provided with an increased radial wall thickness said ring portion will have an increased rigidity so that the snap locking effect is improved. This snap locking is used in connection with temporary closure of the container, which is thus kept tight in case of shock impacts and possible overturning.

Further, when the snap locking means is formed with radial wall reinforcements and incorporates seal means, the visual impression of the container as a so-called pilfer-proof structure is improved.

In a preferred embodiment, the cover is provided with two seal devices so that two pairs of weakened lines are present, each of which extends over a relatively small part of the circumference of the cover and is disposed diametrically opposite each other. This entails that each of the cover circumference parts disposed between the snap locking devices extends through a circular arc of below 180°, and this discontinuity of the bistable circumference causes the ring tension of the cover to be reduced, which contributes to easy upward and downward movement of the locking ring; moreover, opening of the container according to the invention will not result in part of the contents being ejected because of the superpressure which is otherwise often caused upon opening of known containers. The embodiment with two seal devices is additionally ideal in the sense that two such devices (and thus two snap locks) are sufficient to ensure a pilfer evident cover, so that an attempt at unauthorized penetration into the container at the locking ring over an edge arc length of below 180° is impossible, without breaking one of the seals.

Further, the idea of the snap locking device of the invention is also that the bistable loosening ring may be selectively provided on either the container or the cover, so that a radially protruding locking edge for engagement with said ring is correspondingly provided on the cover or the container.

As an additional closure/sealing promoting feature, the engagement faces of the container and

the cover may be made conical, the conicity of the cover faces being slightly smaller than that of the container faces. This, in combination with the snap locking device of the invention, is to contribute to improved sealing at the said temporary closure of the container when, in a given situation of use, the materials are to be dispensed repeatedly. In this arrangement, the cover is biased to some degree before the snap locking effect is established, which is thus to make the snap locking additionally effective when the bistable locking ring is in a folded-up state.

In an embodiment where the bistable loosening ring is provided for the container, it will be appreciated that the opposite proportion between the conicities of the container and the cover faces is to be provided.

The invention will be explained more fully by the following description of a preferred embodiment with reference to the drawing, in which

fig. 1 is an axial sectional view illustrating the snap locking device of the container/cover structure with the loosening ring of the cover in a folded-up state,

fig. 2 is an axial sectional view of the container/cover structure with the loosening ring of the cover in its locking state,

fig. 3 is a top view of the container cover in a locked state, and

fig. 4 illustrates the container/cover structure in a partially perspective view showing the loosening ring of the cover in its folded-up state.

It appears from fig. 1 that the cover 2 is formed with a substantially plane cover face 16 merging into a sealing face 9, which is upwardly hollow in cross-section and which is adapted to receive the edge faces 10 of the container, said faces 9 and 10 thus forming the primary sealing device of the structure. The cover face is moreover connected with a stationary cover flange 6 and has also a sealing edge 8 in its direct, axially downwardly directed extension, said sealing edge 8 and the cover flange 6 defining an annular, upwardly hollow groove 17. This groove is adapted to partly receive a so-called guide rib 7, which projects upwardly from a radially outwardly protruding locking flange 5, which is connected with the container wall 1 somewhat below the container edge 10.

It will be seen from fig. 1 that the upper engagement edge 10 of the container 1 is adapted to cooperate with the interior faces 9 of the cover 2 over a relatively long extent. This is because the cover when being applied slides down over the container edge, so that this edge is automatically cleaned of any container contents disposed thereon, and this cover type has thus a certain mechanical self-cleaning effect via the snap lock.

It is additionally illustrated how the stationary

5 cover flange 6 is connected, via a wall constriction 4, with an extension, radial in locking position, which thus constitutes a so-called bistable loosening ring 3, which is shown in its folded-up, non-locking position.

10 The container cover is formed with wall reinforcements 11 in the form of radial thickenings preferably at two diametrically opposite points, so that the cover edge at these arc sections each constitutes so-called snap locking means (indicated by the unit 12 and comprising the elements 3, 4, 6 and 11 as well as 14 and 15), the length of these arc sections each being defined by two weakened lines 13, which are shown best in fig. 3. When the container is to be closed, the cover is placed with its two loosening ring portions 3 in their folded-up state on the container, so that the cover assumes a position by its own weight, where the sliding face 14 of the "fixed" loosening ring portion 3 rests on the locking flange 5. Axial pressure impact will cause the cover to be moved further down, so that the sliding face 14 is forced radially outwardly until the boss projection 15 of the loosening ring 3 is passed, and then the snap locking effect occurs (see also fig. 4). The provision of the said wall reinforcements 11 imparts improved radial rigidity to the snap locking devices, and this rigidity is precisely to contribute to effective, temporary closing and sealing of the cover when its bistable loosening ring 3 is present in the folded-up state.

15 To make the snap locking function additionally effective, the cooperating faces of the groove 17 and the guide rib 7 may be formed with mutually different conicities, the greatest being that of the guide rib. This causes the cover to be biased to some extent before locking, and this bias has moreover a sealing function. The axial rigidity has the additional effect that the cover, when being removed, has a certain "self-loosening" effect, thus ensuring easy removal of the cover in spite of the relatively strongly dimensioned snap locking device.

20 The above-mentioned conicity between the guide rib 7 and the groove 17 might conceivably also be provided on the engagement faces 9 and 10 of the container and the cover.

## Claims

25 1. A snap locking device for a container (1) with a cover (2), said cover (2) being lockable to the container (1), said device comprising a ring (3) which is formed on the cover (2), said ring (3) being bistable and movable between a loosened and a locked position and is adapted to cooperate with a locking flange (5) on the container, characterized in that said ring (3) is formed with substantially vertical weakened

lines (13), wherein ring portions (3') disposed between at least two weakened lines (13) are exteriorly provided with wall reinforcements, said wall reinforcements (11) extending axially over the ring portions (3') and over a stationary cover flange (6) disposed in extension of said ring (3,3').

2. A snap locking device according to claim 1, characterized in that two pairs of parallel weakened lines (13) are provided, each pair defining a small arc (3') of the ring, the pairs being disposed diametrically opposite each other.

3. A snap locking device according to claims 1 or 2, characterized in that the bistable ring is provided on the cover (2) in extension of the stationary cover flange (6) and is adapted to engage a radially outwardly protruding locking flange (5) on the container (1).

4. A snap locking device according to claim 3, characterized in that the container (1) and cover (2) have substantially vertically oriented engagement faces which are conical, and that the faces (17) of the cover (2) have a slightly smaller conicity than the engagement faces (7) of the container (1).

**Revendications**

1. Dispositif de verrouillage par encliquetage d'un récipient (1) avec un couvercle (2), ledit couvercle (2) étant verrouillable sur le récipient (1), ledit dispositif comprenant un anneau (3) formé sur le couvercle (2), ledit anneau (3) étant bistable et susceptible d'être déplacé entre des positions libre et verrouillée et étant adapté à coopérer avec un flasque de verrouillage (5) sur le récipient, caractérisé en ce que ledit anneau (3) est muni de lignes affaiblies (13) sensiblement verticales, des portions (3') de l'anneau disposés entre au moins deux lignes affaiblies (13) étant munies extérieurement de renforcements de paroi, lesdits renforcements de paroi (11) s'étendant axialement au-dessus des portions d'anneau (3') et au-dessus d'un flasque fixe (6) du couvercle disposé dans le prolongement dudit anneau (3, 3').

2. Dispositif de verrouillage par encliquetage selon la revendication 1, caractérisé en ce que deux couples de lignes affaiblies parallèles (13) sont prévus, chaque couple définissant un petit arc (3') de l'anneau, les couples étant disposés de façon diamétralement opposée.

3. Dispositif de verrouillage par encliquetage selon la revendication 1 ou 2, caractérisé en ce que l'anneau bistable est prévu sur le couvercle (2) dans le prolongement du flasque fixe (6) du couvercle et est adapté à s'engager avec un flasque de verrouillage (5) du récipient (1) s'étendant radialement vers l'extérieur.

4. Dispositif de verrouillage par encliquetage selon la revendication 3, caractérisé en ce que le récipient (1) et le couvercle (2) présentent des faces d'engagement sensiblement verticales qui sont coniques, et en ce que les faces (17) du couvercle (2) présentent une conicité légèrement inférieure à celle des faces d'engagement (7) du récipient (1).

**Patentansprüche**

1. Schnappverschlußeinrichtung für einen Behälter (1) mit einem Deckel (2), wobei der Deckel (2) am Behälter (1) einrastbar ist, welche Einrichtung einen auf dem Deckel (2) gebildeten Ring (3) aufweist, der bistabil und zwischen einer gelösten und einer eingerasteten Stellung bewegbar und dazu ausgebildet ist, mit einem Festhalteflansch (5) auf dem Behälter zusammenzuwirken, dadurch gekennzeichnet, daß der Ring (3) mit im wesentlichen vertikalen geschwächten Linien (13) ausgebildet ist, wobei zwischen wenigstens zwei geschwächten Linien (13) angeordnete Ringbereiche (3') außen mit Wandverstärkungen (11) versehen sind, die sich axial über die Ringbereiche (3') und über einen feststehenden Deckelflansch (6) erstrecken, der in der Verlängerung des Rings (3, 3') angeordnet ist.

2. Schnappverschlußeinrichtung nach Anspruch 1, dadurch gekennzeichnet, daß zwei Paare von parallelen geschwächten Linien (13) vorgesehen sind, wobei jedes Paar einen kleinen Bogen (3') des Rings begrenzt, wobei die Paare diametral einander gegenüberstehend angeordnet sind.

3. Schnappverschlußeinrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß der bistabile Ring auf dem Deckel (2) in Verlängerung des feststehenden Deckelflansches (6) vorgesehen und dazu ausgebildet ist, an einem radial nach außen vorstehenden Festhalteflansch (5) auf dem Behälter (1) anzugreifen.

4. Schnappverschlußeinrichtung nach Anspruch 3, dadurch gekennzeichnet, daß der Behälter (1) und der Deckel (2) im wesentlichen vertikal orientierte Angriffsflächen aufweisen, die kegel-

stumpfförmig sind, und daß die Flächen (17) des Deckels (2) eine ein wenig kleinere Konizität als die Angriffsflächen (7) des Behälters (1) haben.

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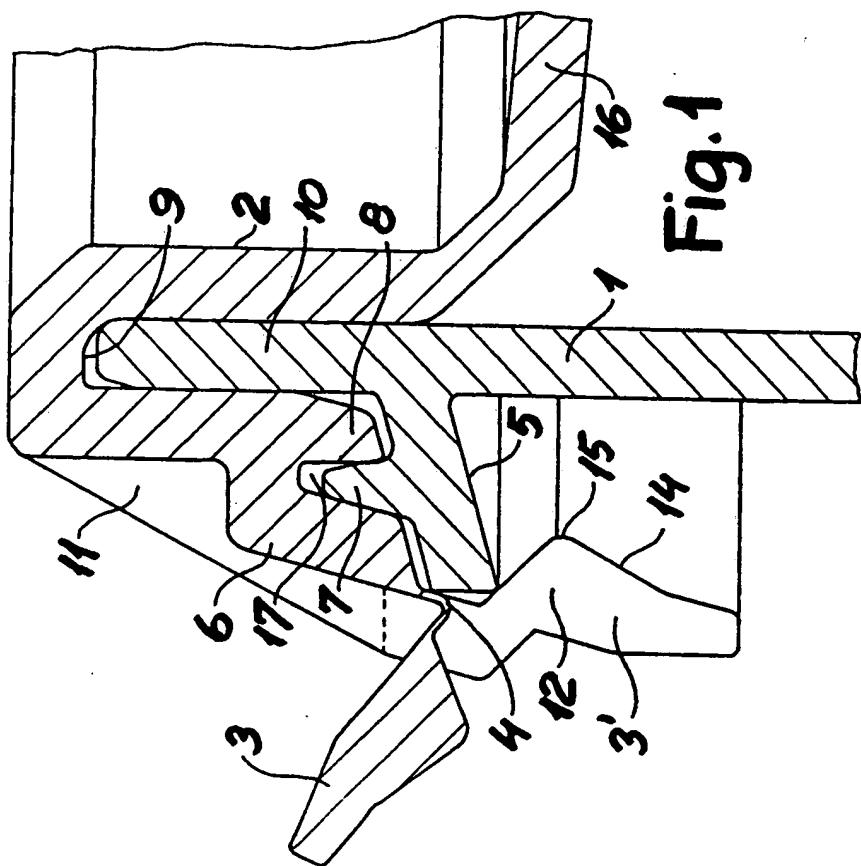
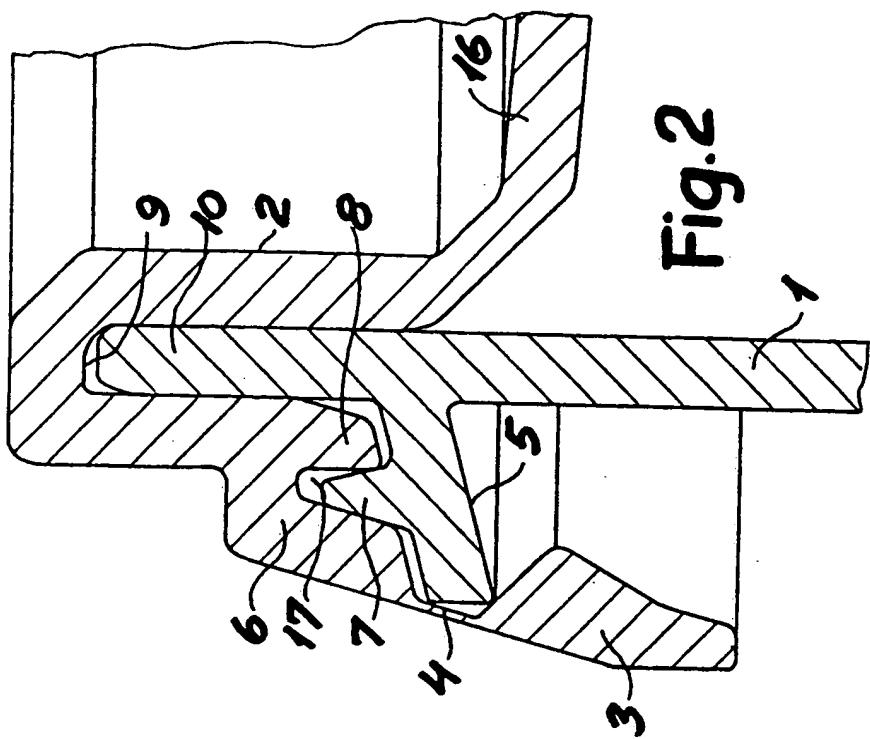
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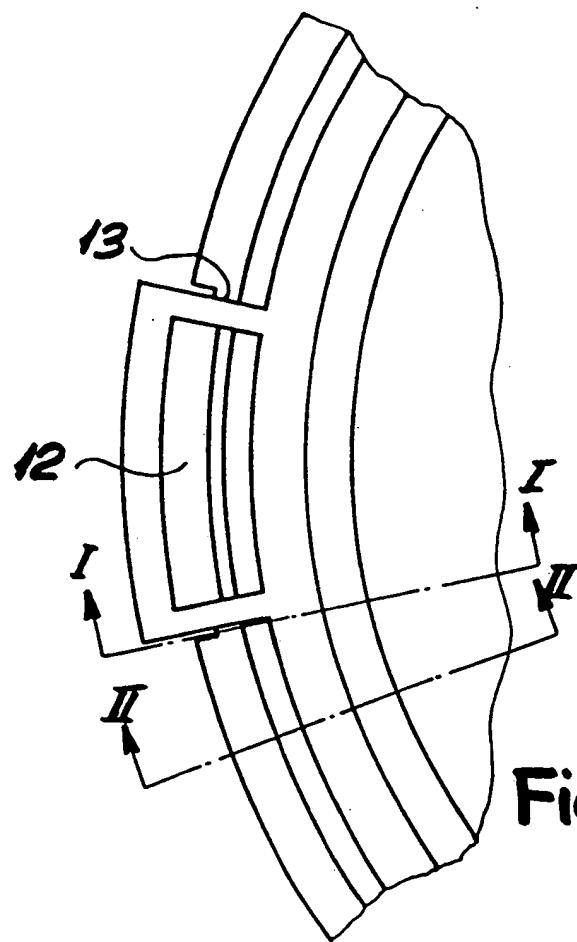


Fig. 3

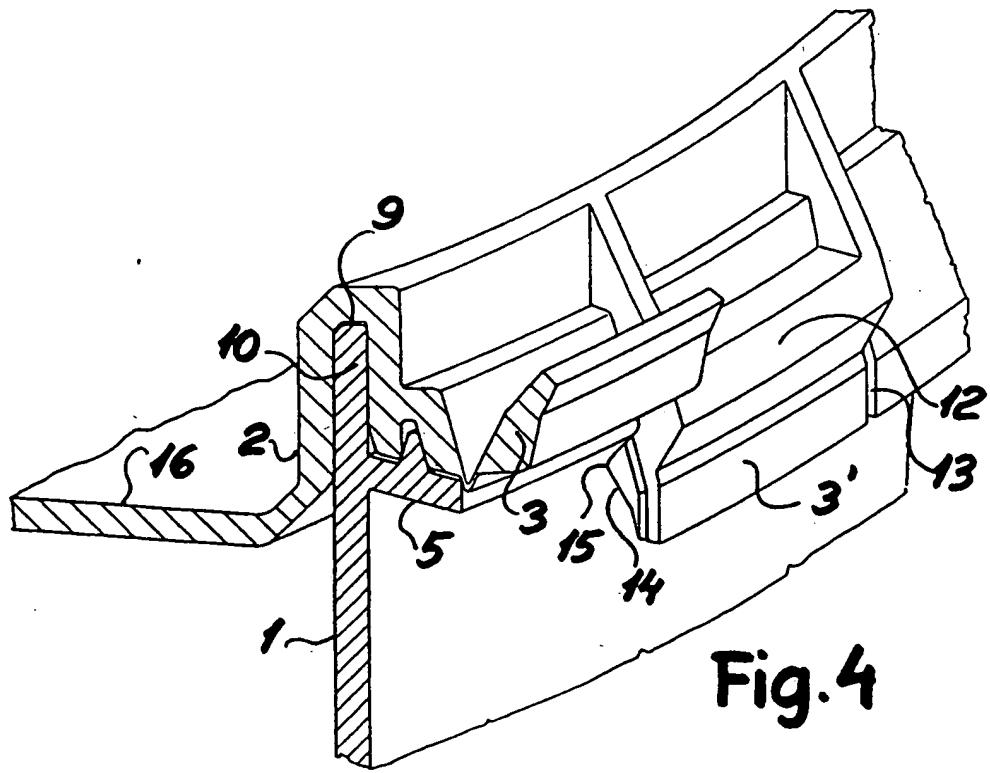


Fig. 4